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Future of Mobility and Data Technologies for Land Systems Integration

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Overview

- Current state of tactical vehicle configuration
- Problems with the current approach
- Building a better system around readiness
- VICTORY: promoting standard communication among systems
- USMC VICTORY prototype
- Benefits of a common GUI
- Q/A

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Tactical Vehicles Customization – Current Business Model

- The existing fleet of military vehicles are integrated with standalone systems
- Systems are appended to vehicles and integrated from a topside RF perspective
- Each system:
  - Adds a display, processor, and cabling to the vehicle
  - Systems operate independent of one another
  - Is installed to improve efficiency but often provides data overload
    - Required SA is split between several disparate systems
    - Crowded cab makes it difficult to accomplish the task at hand
  - Information Pipeline and quality of service (QOS) tradeoff between Mass Vehicle Operations and C2 capabilities (based on Warfighter Feedback)
- Not enough focus on system of systems review during design phase of each system

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Problem: Lives, Cost, and Schedule

- Physical Issues
  - Current integration is a collection of disparate systems
  - Creates SAFETY concern (especially for overturned vehicle egress)
  - Generates heat in the cabin
- Software / Hardware Issues
  - Software & Hardware is proprietary ($$$)
  - Needless duplication of hardware (GPSs, monitors, keyboard, computers, etc)
  - Hardware/software protocols are proprietary (They do not talk to each other.)
  - Programs manage rice bowls and lack good communication

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Building a better model around "readiness"

- Improving tactical vehicle system interoperability will decrease the learning curve for operating out of tactical vehicles
- Reduce SWAP – Increase safety, decrease mission capability change over time
- Common interface helps future users multi-task and reduces learning curve
- Up-front System Of System engineering of applications reduces transition time between applications
- Improve current applications and generate need for future applications
  - Number of applications dramatically improved / increased as Apple/Google opened up mobile phones
  - Design for evolution (Tech Refresh)
- Human System Integration based on heavy interaction with the users during design process
  - Alleviate complexity and space issues caused by multiple disparate systems
  - Enhance warfighter combat performance with optimized interface design

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Vehicular Integration for C4ISR/EW Interoperability (VICTORY): An Army Solution

- Standard & Common communication
  - Define components with standard, “data bus centric” interface
  - IA components: protect data & control access – C4ISR/EW
  - Components: communicate using standard specifications
  - Platform systems: interoperate using shared data bus services
- Benefits
  - Reduces SWaP-C impact of GFE over time
  - Enables new capabilities through interoperability: systems share relevant data
  - Enables commonality: common specifications, software and hardware

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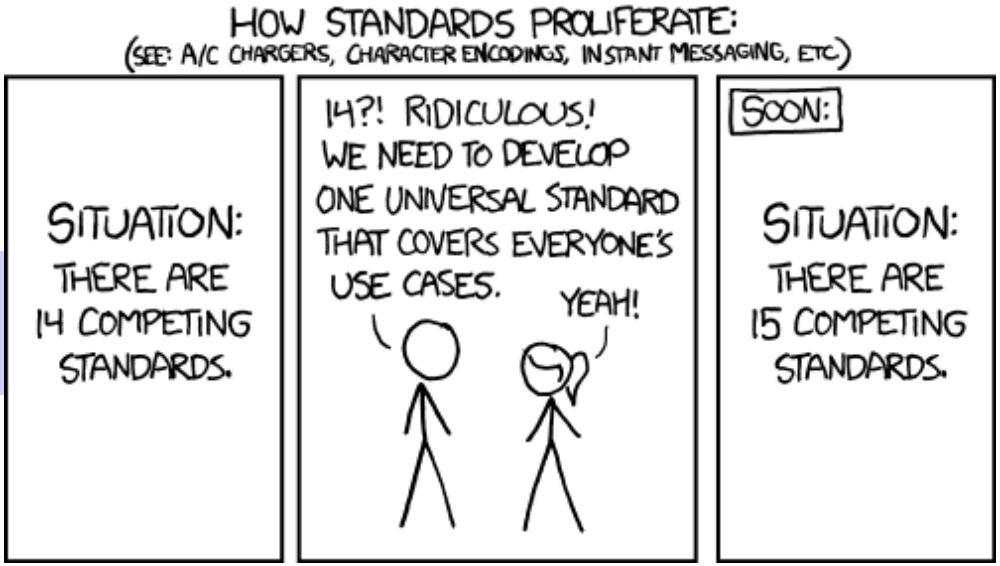
Challenges for VICTORY

Drawbacks

- Enterprise Solution to a tactical platform
  - Latency (time to load up system)
- Information Assurance accreditation
- Redefines communication protocol for proven solutions
  - Radios, EWS, GPS, etc..

Another Standard



Source: https://xkcd.com/927/

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The USMC Approach

M-ATV VICTORY Prototype

- Organizes stove-piped systems with a standardized User Interface (UI)
- VICTORY-Enabled legacy systems including:
  - Voice radios
  - CREW system
  - GPS
- Leveraging DRS' MFoCS hardware already supported by DLA
- Two displays for multi-user operational readiness

Standardize the User Interface (UI)

- Organizes stove-piped systems with a standardized User Interface (UI)
- Provides open source / open hardware solution
- Consolidates software and hardware
- Standardizes access to software (not protocols)

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Future: Evolve a solution

- Fundamentals
  - Auto-discovery technologies
    - VICTORY has auto-discovery that can be leveraged in the design phase – extend to list existing standards (Radios, EWS, etc…)
  - Move to common physical/data link (Ethernet)
- A common GUI can perform multiple roles
  - A common GUI can operate as a network adapter and translate legacy standards into VICTORY protocols
- Evaluate Government involvement
  - Is full network & protocol standard necessary or practical?
  - We must avoid stifling productivity, performance, and security
  - Maximize re-use of commercial standards

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